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EXAMINER

YANG, JIE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/517,906  
Filing Date: November 07, 2005  
Appellant(s): CAMERON ET AL.

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Joseph G. Curatolo  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 1/20/2010 appealing from the Office action mailed 10/02/2009.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

None.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct. However, in view of the Appeal Brief filed on 1/20/2010, **a new ground rejection based on Schlichting (US 5,366,537, thereafter US'537) in view of Edlinger (US 6,409,793 B1, thereafter, US'793), and further in view of the new evidence reference, Anderson et al (US 6,241,510 B1, thereafter US'510) for the instant claim 8 under 35 U.S.C. 103(a) is applied in this Examiner's answer.**

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,366,537	Schlichting	11-1994
6,409,793 B1	Edlinger	6-2002
6,558,614 B1	Fritz	5-2003
6,241,510 B1	Anderson	6-2001

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims, and a **new rejection** based on a new evidence reference is applicable to the appealed claim 8:

***Claim Rejections - 35 USC § 103***

Claims 1-7, 9-14 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlichting (US 5,366,537, thereafter US'537) in view of Edlinger (US 6,409,793 B1, thereafter, US'793).

Regarding claim 1, US'537 teaches a process for smelting iron ore and /or refining molten iron by oxygen and a carbonaceous fuel (Abstract of US'537) with supersonic speed (Col.3, lines 10-22 of US'537), which reads on the refining ferroalloy by blowing oxygen and metallurgical acceptable particle material with supersonic gas jets as recited in the

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instant claim. US'537 specifies: "The coal is preferably delivered in a stream at a speed of between about Mach 0.75 and about Mach 2, surrounded by the nitrogen or argon stream delivered at about Mach 0.5 to Mach 1.5, and the oxygen outer stream is preferably delivered at a speed of about Mach 0.75 to Mach 2.0." (Col.3, lines 14-19 of US'537), which read on the first and second supersonic gas jets as recited in the instant claim. The speeds of gas jets overlap the velocities of the first and the second supersonic gas jets, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed velocity of the second supersonic gas jet being from 10% less to 10% greater than the velocity of the first supersonic gas jet from the disclosures of US'537 because US'537 discloses the same utility throughout the disclosed ranges.

Still regarding claim 1, US'537 does not specify adding metallurgical acceptable particular material, capable of providing a cooling effect as recited in the instant claim 1. US'793 teaches a method for producing steel slags containing chromium (title and Abstract of US'793). US'793 teaches chromium ores or chromium-containing dusts are top blown onto the bath via a hot blast lance by the aid of jet of suitable speed

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(Col.2, lines 13-30 of US'793), which is the same metallurgical acceptable particular material as recited in the instant invention (refer to the instant claim 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the chromium-containing dusts as taught by US'793 in the process of US'537 in order to obtain high-grade ferrochromium alloy (Abstract of US'793). At the same time, the introduction of the same metallurgical acceptable particular material as recited in the instant invention, for example, chromium ores or chromium-containing dusts as demonstrated by US'793 would inherently lead to the cooling effect to the molten metal process of US'537 in view of US'793. MPEP 2112 III&IV.

Regarding claim 2, US'537 does not specify that the metallurgical acceptable material includes metals for example refined alloy, alloys of said metals, oxides of said metals, and mixtures thereof. US'793 teaches a method for producing steel slags containing chromium (title and Abstract of US'793). US'793 teaches chromium ores or chromium-containing dusts are top blown onto the bath via a hot blast lance by the aid of jet of suitable speed (Col.2, lines 13-30 of US'793). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the chromium-containing

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dusts as taught by US'793 in the process of US'537 in order to obtain high-grade ferrochromium alloy (Abstract of US'793).

Regarding claim 3, US'793 teaches that the high grade metal include 35wt% Fe (Col.4, lines 30-37 of US'793), which is within the at least 30wt% Fe range as recited in the instant claim.

Regarding claims 4-7, the chromium-containing dusts (Col.2, lines 13-30 of US'793) read on the chromium-containing metallurgical acceptable material as recited in the instant claims.

Regarding claim 9, US'537 teaches charging metallurgical acceptable material, for example carbonaceous material including of coal, coke, graphite, char, and hydrocarbon gases or liquids (claim 8 of US'537); or charging in the form of solid plugging (Col.6, lines 10-22 of US'537), which reads on the limitation of introducing metallurgical acceptable particular material in fine particular form as recited in the instant claim.

Regarding claim 10, US'793 teaches that the particle sizes of below 4mm, preferably 0.5-2mm, which overlaps the particle size of 1 mm or less as recited in the instant claim.

Regarding claims 11-14, US'537 teaches inert gas flow and oxygen gas flow (Col.2, line 39 to Col.4, line 60 of US'537), which reads on the oxidizing gas (claims 11, 12, 14) and non-oxidizing gas (claims 11 and 13).

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Regarding claims 19-21, US'793 teaches followed by ensured rapid mass transfer, suitable post-combustion will be applied (Col.2, lines 13-31 of US'793). US'793 teaches that in order to ensure the appropriate post-combustion, the hot blast is enriched with oxygen (Col.2, lines 31-33 of US'793), which reads on the limitation of first introducing metallurgical acceptable material (claim 19); then introducing oxygen by gas jet (Claim 20); and finishing the refine operation (claim 21).

#### **NEW REJECTION GROUND**

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'537 in view of US'793, and further evidenced by Anderson et al (US 6,241,510 B1, thereafter US'510).

The Appellant first time pointed out that US'537 in view of US'793 does not teaches refine ferromanganese in the instant Appeal brief filed on 1/20/2010. However, the ferromanganese is one of generic specie of ferroalloy and refining ferromanganese using coherent gas jet is a well-known as evidenced by US'510. US'510 teaches a process of providing gases into an injection volume in one or more coherent gas jets (Abstract of US'510). US'510 teaches the technique is applied to ferromanganese refine



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furnace (Col.3, lines 10-24 of US'510). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the well-known ferroalloy, for example ferromanganese as demonstrated by US'510 in the process of US'537 in view of US'793 to obtain the expected success.

Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'537 in view of US'793 as applied on claims 1-14 and 19-21, and further in view of Fritz (WO 0012767 used hereinafter with US 6,558,614, US'614).

Regarding claim 15, US'537 specifies: "The coal is preferably delivered in a stream at a speed of between about Mach 0.75 and about Mach 2, surrounded by the nitrogen or argon stream delivered at about Mach 0.5 to Mach 1.5, and the oxygen outer stream is preferably delivered at a speed of about Mach 0.75 to Mach 2.0." (Col.3, lines 14-19 of US'537), which overlap the velocity of Mach 1.5 to Mach 4 of the first nozzle and the second nozzle as recited in the instant claim.

Still regarding claim 15 and claims 16-18, US'537 teaches co-axial different streams (Fig.5-6, Col.6, line 60 to Col. 7, line 26 of US'537), but US'537 does not specify the use of Laval nozzles in the supersonic jet streams. US'614 teaches a method for producing a metal melt involving the charging of solid metal

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oxides and a lance for use in the described method. US'614 teaches a lance comprising a first axial gas supply tube terminating at its outlet wherein the mouth part of the tube is designed as a first Laval nozzle, a second tube surrounding the first tube terminating at its outlet, wherein the mouth part of the tube is designed as a second Laval nozzle, and a third tube for forming a supply duct, in particular for solid, fine grained to dust-like substances, wherein the outlet of the third tube is in a divergent part of the first Laval nozzle. The Laval nozzle facilitates high velocities (Col.1, lines 5-15; Col.5, lines 6-14; Col.7, lines 18-23; and Fig.5 of US'614). It would have been obvious to one of ordinary skill in the art to combine process taught by US'537 and the lance of US'614 in order to facilitate the refining of a ferroalloy in term of speed (i.e. shorter processing time). Regarding the combustion chamber in the instant claim 18, US'614 teaches a cavity formed at the end of the lance seen in Fig.5 allows for the combustion of the fuel and oxygen (Fig.5 and Col.5, lines 5-24 of US'614).

**(10) Response to Argument**

The appellant's arguments filed on 1/20/2010 have been fully considered but they are not persuasive.

In the remarks, appellant argues:

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1) The office action has not established a prima facie case of obviousness because the purpose of Schlichting (US'537) is to maintain and/or increase the heat of combustion occurring within the smelting or refining operation being performed by adding a carbonaceous fuel and oxygen; the purpose of Edlinger (US'793) is to improve previous processes of producing steel in order to produce environmentally friendly slags; Schlichting (US'537) and Edlinger (US'793) are not properly combinable Schlichting (US'537) teaches away from any combination with Edlinger (US'793) and the modifying would render each reference unsatisfactory for its intended purpose.

2) The office's burden of providing inherency has not been met. The Office cannot prove that the cooling effect is necessarily provided by the combination of Schlichting (US'537) and Edlinger (US'793), nor can it prove that a person of ordinary skill in the art would recognize the necessary presence of a cooling effect because the amount of carbon in the process of the Schlichting (US'537) /Edlinger (US'793) combination is maintained or increases.

3) Regarding claim 8, Edlinger nowhere discloses the use of manganese, and thus cannot teach or suggest a ferroalloy or metallurgically acceptable particulate material containing manganese as recited in present claim 8.

4) Regarding claims 9 and 10, it is unclear as to how the disclosures of Schlichting (US'537) discussed in the rejection of claim 9 read on the subject matter of claim 9 because the materials taught by US'537 is charged in the form of solid plugging, do not teach or suggest in fine particulate form as recited in the instant claims.

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5) Regarding claim 14, the Office has failed to allege the “burning gases” that either Schlichting (US’537) or Edlinger (US’793), alone or in combination teach or suggest the feature of claim 14.

6) Regarding claims 15-18, Fritz (US’614) does nothing to correct the deficiencies of the alleged Schlichting (US’537) /Edlinger (US’793).

In response,

Regarding the argument 1), as pointed out in the rejection for the instant claim 1, US’537 teaches a process for smelting iron ore and /or refining molten iron by oxygen and a carbonaceous fuel with supersonic speed, which reads on the process of refining a ferroalloy. Adding different raw materials as taught by Edlinger (US’793) does not change the purpose of US’537’s application. US’537 in view of US’793 teaches chromium ores or chromium-containing dusts are top blown onto the bath via a hot blast lance by the aid of jet of suitable speed, which is the same metallurgical acceptable particular material as recited in the instant invention (refer to the instant claim 2), which is a prima facie of obviousness.

Regarding the argument 2), the Examiner notes that: the exothermically reaction and the cooling effect depend on the applied materials and the process. It is the Examiner’s position that the similar material in a similar working conditions would inherently lead to the similar chemical reaction and effect. Further more, the Examiner notes that the amount of carbon in the process of the Schlichting (US’537) /Edlinger (US’793) combination (3wt%-9wt%C) overlap the range of up to 6wt%C as recited in the

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instant invention. The Appellant has not provided any evidence to show the criticality of carbon content in the process to the exothermally reaction and the cooling effect.

Regarding the argument 4), the limitation of a metallurgically acceptable particulate material in fine particulate form is analyzed with its broadest meaning. As pointed out in the rejection for the instant claims, US'537 teaches charging metallurgical acceptable material, for example carbonaceous material including of coal, coke, graphite, char, and hydrocarbon gases or liquids; or charging in the form of solid plugging, which reads on the metallurgically acceptable material. Because most of these material blow charging into the furnace, for example blow oxygen with the particulate coal (Col.6, lines 63-64 of US'537), which reads on the particulate material in fine particulate form in the instant claims.

Regarding the argument 5), as pointed out in the rejection for the instant claims 1 and 14 above, US'537 teaches a process for smelting iron ore and /or refining molten iron by oxygen and a carbonaceous fuel (Abstract of US'537), which allege the "burning gases" in the instant claim.

Regarding the arguments 1), 2), and 4)-6), the appellant's arguments are against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, US'537 in view of US'793 teaches the limitations of instant claims 1-7, 9-14 and 19-21; and US'537 in view of US'793 and further in view of US'614 teaches the limitations of instant claims 15-18. All of the

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recorded prior arts teach the process of introducing oxygen gas and metallurgical acceptable material into the molten metal. "Cooling effect" is recognized as a result which depends on the effective variables, for example, speed of gas, kind of gas, and introducing materials (Refer to page 4, lines 12-29 of the instant specification). As discussed in the rejection for the instant claim 1, US537 in view of US'793 teaches the similar top blowing oxygen and/or mixing gas with the same supersonic speed and using the similar chromium-containing dusts as recited in the instant invention, which would inherently lead to the similar cooling effect as claimed to the molten metal process of US'537 in view of US'793.

Reagrding the argument 3), the Appellant first time pointed out that US'537 in view of US'793 does not teaches refine ferromanganese in the Appeal Brief filed on 1/20/2010. The Appellant's arguments with respect to claim 8 can refer to the new ground rejection as listed above.

This examiner's answer contains a new ground of rejection set forth in section (9) above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR

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41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jie Yang/

Jie Yang, Art Unit 1793

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Conferees:

/ Roy King/

Supervisory Patent Examiner, Art Unit 1793

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700

**A Technology Center Director or designee must personally approve the  
new ground(s) of rejection set forth in section (9) above by signing below:**

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700